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# "APPLICATION OF REMOTE-FIELD EDDY CURRENT (RFEC) TESTING TO INSPECTION OF UNPIGGABLE PIPELINES"

Many pipelines contain internal restrictions that do not allow the passage of inspection pigs that use conventional inspection technology. The purpose of this project is to investigate the feasibility of a remote-field eddy current (RFEC) inspection method that utilizes either a unique collapsible excitation coil or a small rigid excitation coil that can pass through internal pipeline restrictions.

Task 2, RFEC Coil Design, involves the modeling and design of RFEC coils to accommodate the size constraints imposed by internal restrictions. Concepts for a collapsible, segmented excitation coil were described in previous reports. Coil design is now focused on a means to fold the coil so that it could pass through a plug valve. Plug valves are difficult obstacles because they have a keystone-shaped opening that is very narrow. In order to accommodate a plug valve, the coil would have to fold in half instead of each individual segment folding. A design for a mechanism to accomplish both types of folding was developed.

Task 3, Breadboard System, involves development of a laboratory breadboard RFEC system and preparation of a test specimen. Coils have now been wound on all segments of the segmented coil and the coil was configured so that data could be taken with the breadboard system with the coil in the fully deployed configuration.

In Task 4, RFEC Evaluation, the RFEC breadboard system with the segmented coil was evaluated in the 12-inch-diameter pipe test specimen. Based on previous tests with a conventional rigid coil, an excitation frequency of 10 Hz was used in order to obtain penetration through the thick pipe wall (0.375 inch). Signals were obtained from all three flaws; the flaws are all 2 inches in diameter, with depths of 75, 50, and 25 percent of the pipe wall thickness. The amplitudes of the signals obtained with the segmented coil are approximately the same as those with the conventional rigid coil. This shows that the segmented configuration is viable for RFEC inspection and does not cause degradation in the flaw detection capability.

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